Robotics and the meaning of life: a practical guide to things that think

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The new Open University course T184 *Robotics and the meaning of life: a practical guide to things that think* is an introductory course on robotics. It is an undergraduate course taught at a distance over 10 weeks. The course is centred around a web site containing most of the course material, supported by two books: Ruth Aylett *Robots: Bringing intelligent machines to life?* which is a general survey of the field and Isaac Asimov *I, Robot* which is used to motivate questions about the relationship between man and machine. On-line conferences provide study support.

There is also a strong practical element to the course. This was originally designed around the use of the Lego Mindstorms robotics kit. Besides mechanical components, the kit includes the Lego RCX brick – a programmable microcontroller with memory and interfaces to input and output devices such as touch and light sensors, motors and an IR channel to communicate with a PC. Students can build and program an autonomous wheeled robot to carry out a range of tasks of increasing difficulty.

A new programming environment was developed at the Open University specifically to support the needs of adult learners with no prior experience of programming. This provided an opportunity to extend the capabilities of the Mindstorms kit. For example, the robot can now 'talk' by sending IR messages back to the PC where they are turned into spoken phrases. This richer environment is highly motivating. The new software can also take on a processing role to escape the limitations of memory and processing power onboard the robot. For example, students develop a two-agent system in which the mobile robot collects data, transmits it back to the PC where it is analysed using a neural network (built and trained by the student) and results are transmitted back to the running robot.

Developing new software also provided an opportunity to produce a simulation of the robot and we can now offer students the choice of carrying out the practical activities with the Lego hardware or as a simulation. We will look at the attitudes and experiences of students who have chosen these different learning approaches.

Keywords: Robotics, practical, experimentation, simulation